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ABSTRACT

This report on the status, prospects, and future implications of distance education in the states of Alaska, Hawaii, Idaho, Montana, Oregon, and Washington focuses on those delivery systems that provide or could provide instructional units, courses, or instructional supplements to elementary and secondary schools in the region. The first of five sections describes six examples of delivery systems in the region; (1-2) the Satellite Technology Educational Program (STEP) and EDUNET, which make their resources available by subscription to any school district; (3-4) the Idaho Rural Education Delivery System (IREDS) and Alaska Centralized Correspondence Studies (CCS), which serve their specific states; (5) the Community College of Spokane, an example of a technological approach to serving several communities; and (6) the Big Sky Telegraph, an electronic mail network located in Montana. The second section describes delivery systems originating outside the Northwest region whose services are available within the region, i.e., TI-IN satellite, Oklahoma State University Arts and Sciences Teleconferencing Service (ASTS), Satellite Communications for Learning (SCOLA), Technical Education Research Centers (TERC), National Geographic Society's Kids Network Project, Educational Satellite Network (ESN), Channel One service of Whittle Communications, CNN NEWSROOM, and Cable Alliance for Education. The third section describes statewide plans for and studies on distance education in the six northwestern states, and section four reviews state policies on distance education, including certification and content review and quality. The fifth section provides analyses of current school district usage of technology-based systems and conditions that enable or constrain such use, as well as discussions of some unanswered questions and potential roles for the Northwest Regional Educational Laboratory. (DB)

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A DEPICTION OF DISTANCE EDUCATION IN THE NORTHWEST REGION

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March 1990

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INTRODUCTION

More and more discussions among Northwest educators have focused on "distance education" over the last three years. In rural schools particularly, it has come to be symbolic of academic opportunity for secondary students and staff development opportunity for teachers. The high-tech delivery systems involving satellite technology have appeared to dominate the publicity about distance education.

It was apparent when Northwest Regional Educational Laboratory (NWREL) staff members came together in the summer of 1989 to discuss the nature and extent of interest in distance education in the region that a wide range of activities were under way, both in the development of instruction for distance delivery and in the use of existing delivery systems. Some systems were satellite-based and some made use of other technologies. In addition, a number of statewide plans were in the process of development which were designed to address the technical and organizational structures necessary to provide more opportunities for schools and other agencies to use distance education. As a result of the discussion, this report was commissioned to provide a summary of the status, prospects, and future implications of distance education in the region.

This study does not cover the broad range of telecommunications in schools. Rather, it is concerned with those systems which provide or could provide instructional units, courses, or instructional supplements to elementary and secondary schools.

DELIVERY SYSTEMS IN THE REGION

The term "Delivery System" in this report describes an organization which develops and presents instruction in either full course or supplementary form for use by a range of communities or client agencies. Of the six examples described in this section, STEP and EDUNET make their resources available by subscription to any school district, and IREDS and Alaska CCS serve their specific states. The fifth example, Community College of Spokane, is included primarily as an example of a particular technological approach to serving several communities. While it does not sell services to a general audience outside its area, the approach it uses could be used in other geographic areas.

Satellite Technology Educational Program (STEP)

The Satellite Technology Educational Program (STEP) has been in operation for five years. It is a cooperative operated by Educational Service District 101 in Spokane, Washington, but governed by an advisory committee representative of the member school districts. The organization develops and produces televised secondary school courses and staff development sessions and delivers them by satellite to 93 schools in 74 districts in the region, and to many districts outside the region as well.

Six full-year secondary courses are offered in two foreign languages, mathematics, and advanced English. School districts wishing to use the services pay a base fee of about $4,500 the first year plus usage fees based on the number of courses taken and number of students enrolled. The project is entirely funded by the usage fees, including development, instruction, and transmission. STEP contracts with a local company for transmission. The cost of a satellite antenna, other local receiving equipment, and installation at the school are part of the initial base fee. Course offerings and topics for new course development are determined by the advisory committee.

Primary enabling conditions for the continuation and growth of STEP are the rural nature of the region, the increase in university entrance requirements for foreign languages in the region, and the positive reception of the system in the subscribing schools. The initial consortium members were small rural districts and the nearby states have a preponderance of such districts. They all share the problem of obtaining teachers qualified in special content areas to meet all students' needs. An additional motivating factor is incorporation in the system of a plan of support to subscribers which makes use of teachers in addition to the television teacher to handle homework and interaction with students. They are located in geographic clusters of subscribers which are a long distance from Spokane.

The constraints on expansion of the system are the initial and ongoing costs of the service to a school district and, in some states, the rules for teacher certification and graduation credit. The rules sometimes require that the television teacher be certified in the receiving state, and that a certified teacher be the in-school monitor of the receiving students. The first is an imposition on the deliverer and the second on the receiving district.

EDUNET

EDUNET is a private, nonprofit organization formed to provide instructional opportunities to schools in Montana through a computer-based system of electronic mail and on-line testing. Ordinary voice-grade telephone lines and standard microcomputers commonly found in schools are used for course delivery. Individual teachers develop and monitor the courses. Student instructions, worksheets, support materials, and tests are stored on a central microcomputer, and printed at any school computer on request. A course is conducted on an individual progress basis, and operates much like a correspondence course, except that student-teacher communication takes place with no more than a 24-hour delay and testing takes place on the computer with results immediately provided to the student.

The organization provides over 50 course options and has 37 subscribing districts in Montana, one in Washington, and three in Idaho with a total of 110 students. Districts subscribe for service by student and course at the rate of $250 per student per semester. The user fees are intended to pay all costs of the central system including equipment and software, although some grant support was obtained initially for some hardware. Course development and instruction costs are also covered by the fee, because course developers and teachers are paid a percentage of the fee of each student enrolled in their courses. The board of directors governs the organization. An advisory board composed of representatives of subscribing districts provides advice on needs, suggestions, and problems.

The EDUNET schools are extremely enthusiastic about the system and are a strong force in the involvement of new users. The simplicity and relatively low cost of the system, especially the in-school equipment, is attractive to small districts. Cost, however, is also a constraint in that the costs could rise for EDUNET proportionally faster than for STEP or IREDS because the fee levels charged in the beginning years did not include a percentage for expanding the hardware and staff in the system to improve response time and capacity to support a heavy increase in users.

Idaho Rural Education Delivery System (IREDS)

The Idaho Rural Education Delivery System (IREDS) is a consortium of the State Department of Education, Boise State University, and the Idaho Public Broadcasting System. Now in its third year, the system develops and produces television courses for broadcast to Idaho secondary schools. The State Department is the governing agency and provides program planning assistance and funding; personnel of the Simplot-Micron Center for Educational Technology at Boise State University carry out course development and production. Teachers of the courses are selected from the Boise School District. The courses are transmitted by the broadcast facilities of the three television stations in the IPBS system. The difference in transmission method between IREDS and the STEP system described above is that only members can receive the STEP signal, while anyone having an ordinary television receiver who is within range of the public broadcast signal of an IPBS station can view an IREDS course. In both cases, a telephone link between the studio and the receiving classrooms permits conversation between students and the teacher, so a casual viewer of IREDS could not participate in that part.

The cost of the system in the first two years was paid by a combination of funds appropriated by the legislature, corporate grants, and in-kind support of staff and facilities from the State Department, Boise State, and Boise School District. Legislative appropriations and possibly user fees are anticipated to be the long-term basis of financial support. Presently three courses are offered: Spanish I and II, and Advanced Mathematics. A total of 11 districts are participating, with nine receiving Spanish I, five Spanish II, and two Advanced Math, enrolling a total of 74 students.

The enabling and motivating conditions for IREDS, in addition to the rurality of the service area which is true for all the systems described here, are the political support from the legislature and communities, the financial support of

private industry as well as government, and the availability of inexpensive development and transmission facilities of Boise State and IPBS. A constraint on expansion is the uncertainty of long-term financial support.

Alaska Centralized Correspondence Studies (CCS)

The Alaska Department of Education has within its organizational structure a correspondence school, Centralized Correspondence Studies (CCS). The school provides a complete faculty and a full curriculum. It serves many individual students in remote or isolated locations, and is making an effort to support the in-school use of correspondence courses and instructional materials as a means of increasing the educational opportunity in schools with a small staff. It has been using telephone conferences of teachers with their enrolled students to increase the teacher-student interaction. Also, it has introduced the use of electronic mail for messages between students and teachers in a few courses. Student work is sometimes transmitted in this fashion, and students are using the system to communicate with each other. Teachers supervising the in-school use of the courses also communicate with the CCS teachers about various aspects of course content and student progress. The electronic mail system is provided by the University of Alaska which operates UACN, a statewide telecommunications network. As a result of initial success, the redesign of courses will increasingly incorporate electronic mail as a component as CCS teachers learn to use the technique effectively. Currently, three districts are using CCS courses incorporating electronic mail in an in-school setting.

Community College of Spokane

The Colville Center of the college has used an audio-graphics system for four years to link students in five remote communities with a classroom at the Center. The system consists of a microcomputer, graphics tablet, and speakerphone at each remote site and the classroom. Classes are conducted by a teacher in the classroom in the standard manner. Individual students or small groups of students at the remote sites participate in discussions and listen to classroom presentations over the phone. Either freehand graphics or computer-generated graphics produced at the classroom or any remote station are displayed at all stations on the network. The graphics tablet can be used as an electronic blackboard by teacher or students.

Courses for this system are not specially designed and produced for transmission as in the other options described above. However, teachers who have used the system are learning some techniques for dealing effectively with students at remote sites. Receiving equipment and production costs are far less than for televised courses and, although the phone line costs are likely higher, the total cost of delivery and reception in such a system is also far less. However, the cost of an installation is not usually spread over as many users as in a television system such as STEP. Financing of the Colville Center system was by a combination of grant and institutional budget (partially reflected in student fees). A typical class session would have about 20 students in the Center classroom and one to three in each remote site. Two to four class sessions per day use the system.

The college does not serve clients outside its area. That is, a student must enroll in a college course. However, this type of system could be used in any situation in the region where qualified teachers exist at one site, and students need instruction at schools within a few miles. Once installed, there are few constraints on the expansion of the use of an audio-graphic system. Extensive production and teacher training are not required. The initial cost of $25,000 to $50,000 for the delivery site equipment is a constraint. A prospective implementing agency must have a sufficient population to serve to justify the cost.

Big Sky Telegraph

The Big Sky Telegraph is an electronic mail network located at Western Montana State College. Originally, it was designed to link the teachers in the 116 one-room schools in the state with each other and with the resources of the College. In two years, it has grown to serve social service agencies as well, becoming a resource to entire communities. It has begun to serve areas outside Montana, including Wyoming and Colorado. A recent grant from the U.S. West Foundation has supported the expansion. Also, National Diffusion Network coordinators in the 15 western states will soon be using the system. In addition to electronic mail, the system includes on-line bulletin boards and databases, and supports teacher requests for assistance in locating resources, obtaining items from the

College, and assistance with instructional problems. Having been established and operated so far on grants, the organization is beginning to implement a user fee structure as partial support for the system.

Big Sky is not a full-fledged distance education delivery system in the manner of the previous examples because it does not develop instructional programming for elementary or secondary students. However, it is a major resource in the region which could serve a wide range of educational systems having similar problems of rurality, isolation, and lack of access to information resources. It could be a vehicle for distance education of the EDUNET and Alaska CCS types described above, and the TERC and Kids Network systems described in the next section. The system is being used for delivering two undergraduate courses to students at the college in the current term.

OPPORTUNITIES ORIGINATING ELSEWHERE

A number of delivery systems are located outside the Northwest region whose services are available in some or all of the states in the region. All but one of the major examples described in this section are based on television transmitted by satellite. In all of the cases, participation is open to any school district which can receive the signal regardless of state boundaries. In the satellite systems, the signal transmission has boundaries (known as the "footprint") which vary with the location of the particular satellite being used. Thus, Alaska and Hawaii are unable to participate in certain delivery systems because the signal does not reach them. The organizations operating delivery systems are investigating ways to extend their services to unserved areas.

TI-IN

TI-IN is a Texas corporation which has been developing secondary school courses, supplementary elementary school instruction, and staff development courses for several years. The original courses were developed in conjunction with a regional educational service district in Texas. The instruction is televised and delivered by satellite. However, the signal is encrypted to ensure that only subscribers with appropriate equipment are able to participate. A specially designed classroom receiving station is provided to subscribers and either a fixed or steerable dish antenna may be installed.

The footprint of the TI-IN satellite does not include Alaska and Hawaii. Currently, 21 schools are receiving sites in Idaho, Montana, Oregon, and Washington. Four are supported by the Star Schools project operated by TI-IN, and 17 are regular subscribers. Star Schools sites received a free loan of equipment for as long as they are participants. Ongoing costs of programming will be the responsibility of the districts. Northwest students are enrolled in Japanese, Spanish, Physical Science, Algebra, and Anatomy-Physiology. In addition, a job service center and a Job Corps center are subscribers.

Oklahoma State University

The Oklahoma State University in Stillwater, Oklahoma is one of the first agencies to operate a satellite-based delivery system, the Arts and Sciences Teleconferencing Service (ASTS). For school districts, it currently offers nine televised secondary school courses and two middle school courses, and a wide range of courses and teleconferences for staff development.

All states in the NWREL region can receive the signal from this source. Currently, four schools in three states, Idaho, Montana and Washington, are subscribers. A total of 41 students are enrolled in German, Calculus, Physics, Chemistry and Basic English.

Satellite Communications for Learning (SCOLA)

Satellite Communications for Learning (SCOLA) is a nonprofit consortium of schools, colleges, and other agencies which provides access to television news programs from over 40 countries around the world. Programs are received by satellite and redistributed to subscribers in the same manner from the organization headquarters at Creighton University in Omaha, Nebraska. The service operates 24 hours a day, year-round. Reception and rebroadcast is live

from France, Italy, Mexico, and the Soviet Union, and by tape for other countries. The service has been used by elementary schools as well as colleges and high schools. A fee structure is based on the number of students served, so that a school district, a university system, or even an entire state agreement can be arranged, achieving lower per-student costs as the student coverage increases. For example, the annual cost for K-12 usage ranges from approximately 40 cents per student for 10,000 students to 12 cents per student at the level of 100,000 students.

Simultaneous English translation on an audio subcarrier of their satellite signal is provided. Thus, the programs can be used by foreign language classes for current material in both the language under study and in English. Also, courses in geography, global studies, and other social sciences in which current events are useful can use the English version. Different perspectives on the same event can be viewed and compared. Secondary foreign language teachers who have used the broadcasts report that they must spend extra preparation time to review tapes and select useful segments for translation or other activities. However, they believe the opportunity to receive and use current material is of high value and worth the effort. Local or state projects could be developed to produce some of the instructional materials which are usually required for teachers and students to use the broadcasts effectively, lessening the impact on teacher time. While the information from this source is direct and not packaged for instruction, it offers a wide range of possible applications in many curricular areas and student age levels.

Currently, there is one subscribing university in the region. The SCOLA organization appears to have a resource of great potential for schools, but no process for getting its message to the K-12 audience in the Northwest region. A few contacts with state education department personnel have been made.

Technical Education Research Centers (TERC)

The TERC organization is unique among the major delivery systems, providing supplementary instruction rather than full courses and using electronic mail rather than television. The main premise of their approach is that students of science and math will be more motivated and will learn better if they engage in hands-on experiments and are provided the opportunity to communicate with other students the nature of their experiences and conclusions. This approach is being used in two separate but similar projects, Star Schools and LabNet, both federally funded. In both projects, TERC is developing instructional units in secondary science and math and establishing an electronic mail network. In addition, a group of collaborating agencies in various parts of the nation have been identified to act as regional training and dissemination centers for schools. NWREL is participating as one of those centers in both projects. The centers train teachers and other trainers, and provide advice and other support to teachers by phone and electronic mail. Approximately 20 units are under development or in pilot test. In the Northwest region, four Oregon high schools participated in Star Schools pilot activities during 1989 and 1990, and teams of trainers have been trained in Hawaii and Oregon, with workshops planned in the other four states.

Long-term plans are in process for the instructional unit materials to be available from a publisher in the 1990-91 school year, and for an economical electronic mail system to be established and available for subscription in that same time period. Costs of the pilot activities and teacher training have been supported by grants from the U.S. Department of Education and the National Science Foundation. At this point, ongoing costs are undetermined. TERC intends for the units and telecommunications to be made as inexpensive as possible to maximize the participation of school districts, but the system will need to become self-supporting.

Experience in this region thus far indicates that this mode of instruction is interesting and exciting for students, and brings some realism to the study of science. Pilot teachers have all been excited about the possibilities offered by the system. However, the instructional approach is a great departure from standard practice for many. There are questions about how to make the units fit with the existing curriculum, especially when a major effort in this direction would imply major change in the curriculum.

National Geographic Society

A source of similar instruction is the National Geographic Society Kids Network project, which produces hands-on instructional units for elementary students and operates an electronic mail network linking students across the nation. The TERC organization was a partner in developing the first units and conducting the pilot test. The

ongoing service is now provided directly by the National Geographic Society. Schools in Oregon and Washington were involved in the pilot testing phase. Currently, 32 schools in five states of the region subscribe to Kids Network. One subscription represents one school and usually involves about 30 students. Hence, about 900 students in the region are now users of the system. The target audience is grades 4-6, and plans are to develop middle school activities in the future. In both the TERC and Kids Network projects, a continuing concern of participating schools is the cost of telecommunications. Some consideration has been given by people in the region to the possibility of foregoing national contact to focus on statewide or more local links to provide the experience at lower cost.

Education Satellite Network (ESN)

ESN is a function of the Missouri School Boards Association. It is a clearinghouse and broker for satellite-delivered instructional television programming of all types, including student material and staff development. ESN provides a custom-designed school receiving station including video monitor and satellite antenna which is capable of receiving the signal from any delivery system with which ESN has an agreement. The organization provides users with a limited amount of original programming, but primarily serves a clearinghouse function. If a district wishes to obtain a course from a delivery system such as Oklahoma State, it must subscribe directly to that service source. The ESN service is available outside Missouri through state school boards associations. In the Northwest region, only the Idaho School Boards Association is currently a subscriber. Within Idaho, four districts are now participating and have installed the equipment, although they are not yet heavily involved in course reception.

Other Resources

A number of opportunities exist for supplementary instruction from outside the region, primarily by television and electronic mail. The most well-known of these is the Channel One service of Whittle Communications, in which a twelve-minute news and current events program is sent to schools by satellite daily, including up to two minutes of product advertisements. A participating school pays no fee, and receives free equipment including a satellite receiving dish, color monitor, and related cabling and equipment. The school must require students to watch the program. This type of arrangement has caused great controversy within the region and across the nation. In Oregon, for example, the Portland *Oregonian* newspaper has printed two statements from school officials in favor of the arrangement, and 19 schools in five districts have signed agreements to participate. However, the Oregon Education Association Board of Directors recently voted to oppose Channel One on grounds that classrooms should be free of commercial pressures. The Oregon State Board of Education has passed a resolution that a decision to use such resources should be made by local districts, but that class time used for commercial advertising shall not be regarded as instructional time under rules requiring minimum class times for students. The Board also requested that the State Superintendent conduct an impact evaluation of such programming. The overall regional use of Channel One is by 36 schools in 13 districts in Oregon, Washington, and Idaho, with additional commitments in process. The service is not offered in Alaska and Hawaii at this time according to a Whittle representative.

Educational programming of a similar nature but without commercial advertising, CNN NEWSROOM, is now being offered on the CNN cable television channel by Turner Educational Services, Inc. The program is designed with the assistance of professional educators and is provided free to schools. Schools will tape the fifteen-minute program because it is transmitted at 3:45 a.m. weekdays, and may use the tape for any in-school educational purpose. Daily classroom guides and supporting instructional materials are provided by subscription to the X*PRESS/X*CHANGE text service on cable or the GTE Education Service electronic mail.

In September 1989, a consortium of major cable television programmers formed the Cable Alliance for Education to foster partnerships between system operators, cable programmers, and the schools. In addition to coordinating commercial-free programming and clearing copyright restrictions, the alliance proposes to develop curriculum-based support materials for teacher use with programs.

In this category of services, statistics on the level of use in the region are not available, except for the Channel One figures already stated above.

STATEWIDE PLANS AND STUDIES

In addition to the major development efforts in several states in the region described in the previous section, some of the states are conducting studies and implementing activities directed at statewide planning, coordination, and development of the infrastructure for distance education. These efforts vary from a focus on the telecommunications network to plans for statewide licenses for programming and support for potential users. In some cases, a wider user community than education is covered in a plan, including corporations, nonprofit agencies, and government departments. The Oregon ED-NET plan involves a strong collaboration among different state agencies and private nonprofit and for-profit corporations. The Oregon and Hawaii plans show a strong link between education agencies and the public television system, a link already demonstrated in the IREDS system noted previously.

Alaska

The statewide delivery of distance education is evolving from the Centralized Correspondence Studies division of the state department of education and its increasing use of electronic mail and computers in course design. A five-year plan for distance education for the period from 1987-92 was developed by CCS staff, and it has been followed by CCS in its expansion of the use of technology in correspondence courses. The telecommunications aspect of statewide service is vested in the University of Alaska UACN system providing electronic mail, and in the Rural Alaska Television Network (RATNET). Neither of those systems is under the control of the state education agency. They are in the CCS plan only as systems which CCS can use, not as systems whose expansion or improvement is integral to the overall plan.

A survey of all district superintendents and school principals in the state, currently being carried out by the State Department of Education with the assistance of NWREL, is to be completed in March 1990. The survey is intended to identify the level of interest in distance education for schools and communities in the state, and the needs and priorities which it could address. Information from the study will be considered by the State Department of Education and the State Legislature in the next few months as they contemplate next steps in the state support of distance education.

Hawaii

One of the few state plans in the nation having the term "Distance Learning" in its title was developed by the State of Hawaii through the collaboration of three agencies: the Department of Education, the Department of Labor and Industrial Relations, and the University of Hawaii. The "Distance Learning - Technology Plan" published in August 1988, recommends actions which support a goal of barrier-free lifelong learning opportunities. Distance education is broadly defined to include support for a wide range of student needs, including career exploration, advanced courses, foreign language contacts, and many others. The plan incorporates a variety of technologies including computers, television, radio, and telephones. Full implementation is projected for 1994, and will require an investment of over $10.6 million for the six-year period.

Although delayed for a few months, the plan was begun in 1989 and is proceeding as projected. Seven pilot projects addressing several different technologies and need areas were begun in 1989-90. The videophone and electronic mail pilots are actually ahead of schedule. A videophone will be installed in every school by April 1990, and electronic mail is available to teachers and students in every school which has a modem with a microcomputer (approximately two-thirds at this time). The seven initial pilots can be considered supplementary and enrichment for the regular curriculum. The eighth pilot, called Teleschool, will begin in 1990. It will use the Hawaii Interactive Television System (HITS) for student courses. HITS is currently used for interactive teleconferences and other staff development purposes.

Idaho

Idaho has no comprehensive published plan for distance education and telecommunications. In 1988-89, a statewide survey was conducted by the Rural Education Program of NWREL and the Idaho Department of

Education which provided some basis for planning for services to districts. In 1989, the Simplot/Micron Technology Center developed a proposal for a statewide multimedia teleconferencing system for education and government based on integrating existing public and private telecommunications resources. The proposal is one of a number of options under consideration by the State.

Montana

As the result of an earlier task force effort, the State of Montana in 1989 formed the Montana Telecommunications Cooperative composed of both education and noneducation public agencies in the state. The Cooperative has issued a contract to a private firm to conduct a study of the needs for and feasibility of a telecommunications network for the state for a variety of educational and other purposes. The study, now under way, is managed by the Department of Administration, and will address the needs of elementary and secondary education, higher education, and other agencies or groups in state government. It is scheduled to be completed in the summer of 1990. The cooperative is currently chaired by the Superintendent of Public Instruction.

Oregon

The development of a state plan for a telecommunications system was conducted during 1988 by a broad advisory committee established and funded by the Oregon Legislature. The result was a plan and recommendations for Oregon ED-NET, published in July 1988. The plan was approved and funded with seed money by the legislature in 1989, and a board of directors appointed by the governor has embarked on a program to establish a network and provide services. A goal is to become self-supporting on user fees and other income in three to five years. The ED-NET organization will provide a statewide network using a satellite, microwave, ITFS and other links, and will supply satellite receiving dishes (downlinks) to all higher education institutions, high schools, middle schools, and some elementary schools in the state. A satellite uplink capability is planned for installation at Oregon Public Broadcasting. The network is intended to carry video and audio signals and data.

State agencies, private nonprofit agencies, and corporations are envisioned as potential members in addition to education organizations. Programming services will be provided primarily by the agencies using the network. The Oregon Department of Education, for example, is making arrangements for courses to be available in September 1990. A fee structure for receivers and providers of programming will be established.

The organization is envisioned to have a small staff and a high level of contributed expertise on active advisory committees provided by the major institutions having a high level of interest in the system for their constituents. A strong contractual relationship with Oregon Public Broadcasting was recommended for facilities and other support. The network structure is being implemented in three phases, and proposals have been requested for implementing the first phase specifications.

Washington

In December 1988, the Washington Superintendent of Public Instruction published a "Linking for Learning: K-12 Educational Telecommunications Plan." The plan, produced by a task force of educators, contained goals of increasing access to educational opportunities, improving the quality of teaching and learning, and enhancing professional growth and development. It was comprehensive in dealing with the complex variety of implications of telecommunications in instruction, dealing not only with the technical infrastructure but also with inservice, curriculum development, technical assistance and consultation, and policies, with a budget of over $8.7 million for the 1989-91 biennium. The State Legislature, which requested the plans in 1987 legislation, declined to fund the plan in 1989.

STATE POLICIES CONCERNING DISTANCE EDUCATION

In a national study of state policies regarding distance education in 1988, NWREL staff found that such policies come from a variety of sources, depending on the agencies in a state which have responsibility for various

components. Although we first looked to the state education agencies, we found that other governmental units often had responsibility for telecommunications networks, and still others for programming, teacher certification, and accreditation. In addition, legislation sometimes contains specific references to distance education. Also, in some cases, policy is embodied in state plans which may be drawn up by a cooperative group of representatives of education departments, higher education, administration, and other organizations. The status of each of the states in this region in regard to statewide planning was described in the previous section.

One way to characterize the policies in the region is to examine the general approach of states regarding the place of distance education in the overall concept of education. Three distinct approaches are evident. The Hawaii approach through their state plan takes a strong proactive stance by stating general goals and specific objectives which clearly say that distance education and related technologies are very important for the future of education in the state at all levels and ages. It proceeds to identify stages of implementation and pilot activities to test concepts, together with a budget.

A second approach, more moderate, is exemplified by Oregon, where the State Legislature at the request of the State Board of Education modified statutes to add explicit references to distance education to the radio and television references already included which declare them to be suitable means of instruction, and authorizing (but not requiring) the Department of Education to engage in development, planning, and other activities for school districts.

The third approach is the stance taken in Montana, where a rule of the State Board of Education states that distance learning may be used as part of the instructional program of a school district, but categorizes it as an alternative to the standard for which districts must apply. The burden of justification, evaluation, and other requirements are placed on the district.

A review of policy statements collected in the aforementioned national study led to the identification of major categories of concern for users and producers of courses or other opportunities for distance education. It is a useful way to look at the status of policy in this region as well.

Certification

There are two major concerns in this area. One is for the certification of the teacher in the originating organization as, for example, the teacher of a STEP course. In that case, states other than Washington might be concerned that the teacher be certified in their state if their schools are to use the course. The problem for STEP is that they must certify the teacher in most of the receiving states as well as Washington, which sometimes requires the person to take special courses. A second problem can occur in specific subject areas such as Japanese language, where a person is available who is fluent and can teach but is not certified for secondary teaching in any state. This frequently happens when an organization tries to make use of an instructor from a university.

The second major concern is for the person who is responsible for the students at the receiving school, usually referred to as facilitator, monitor, or coordinator. Some states require that the person be a certified teacher, while others allow an aide but require that the person be supervised by a certified teacher.

In the 1989 Oregon Legislature, amendments were made to state law to deal with some of these concerns. They exempt from the provision regarding forfeiture of basic school support funds a school district that assigns a teacher to be present during a distance learning situation whose assignment does not conform to terms of their teaching certificate. It also considers teachers presenting distance learning to have met certification requirements if they hold a current certificate of another state and pass a nationally-recognized basic skills test. However, this allows neither for an aide to supervise a distance learning class nor for an uncertified teacher from the delivery system. The Oregon Teacher Standards and Practices Commission is currently revising their regulations to reflect these changes.

In the rules issued by the Montana State Board of Education, part (d) addresses certification by requiring the applying district to validate "that the teachers of distance learning courses are certified and appropriately endorsed in Montana, eligible for certification in the sending state or certifiable in their resident state and have experience in delivering instruction via distance learning. If the teacher of a distance learning course cannot meet any of the

above certification criteria, then the facilitator in the receiving classroom must be certified at the appropriate level, but not necessarily endorsed in the area of assignment."

The Idaho Department of Education has issued a distance education policy which includes the statement that a teacher in a distance education program "must hold a teaching certificate valid in the state where the program originates and must meet the minimum academic requirements of the Northwest Accrediting Association." Furthermore, in regard to the school, the policy states, "The receiving site shall employ an adult to supervise and monitor students enrolled in the distance learning class. This person may be a paraprofessional, although it is recommended that such a person be a certificated professional."

Content Review and Quality

Concern for the content of instruction delivered by distance education methods is parallel to that for any instruction. States do not generally draft new rules specifically for distance education in regard to matching the state content objectives or other guidelines. However, a concern for the quality of instruction does show up as a special consideration.

The revised Oregon statutes provide that the State Board of Education shall approve distance learning programs for both direct instruction and enrichment. Also, the Board is directed to appoint an advisory committee to advise the Department of Education on standards and criteria for such approval, among other items.

Montana rules stipulate that to use a distance course, a district must apply for an alternative to the standard, and must describe how the course will meet learner goals and show how the effectiveness of the course, teacher, and facilitator will be assessed. This implies that advance indicators of quality are not required, but only that a process for evaluation must be planned.

Idaho policy states that any elective course must be reviewed and approved by the Department of Education, and that any course required for graduation must contain all the critical components for secondary school courses as outlined by the Department. The burden of proof is apparently on the district.

Other Policy Areas

On a national basis, state policies sometimes reflect a concern for other factors in instruction such as class size and credit. On those two issues particularly, only Idaho within this region appears to be explicit in applying existing rules for regular classrooms to distance education courses. They specify that since the teacher at the sending site interacts with, evaluates, and remediates students, the maximum class size shall not exceed 32 students per teacher. Regarding credit, Idaho limits credit earned through distance education to three units or six semester credits for graduation purposes.

The advent of the initiative by Whittle Communications to provide a satellite dish and related classroom equipment free to schools in return for a commitment to show a 12-minute daily news program to students has caused controversy across the nation. There are two minutes of commercials in each program. In this region, the Oregon State Board of Education has resolved that local districts should decide whether or not to participate. However, time spent on commercials may not be counted as instructional time for basic school support purposes, and students must be excused if parents object. Other states have not taken an official position.

ANALYSIS AND CONCLUSIONS

The overview of available distance education services in sections II and III indicates that interested school districts have a wide range of options in types of systems and subject areas. However, some of those options are open at this time only to districts within the state of origin. It is also true that the two systems within the region which are made available across state boundaries, STEP and EDUNET, still have most of their impact within their own states. The charts on the following pages summarize the current school district usage of the technology-based systems.

1989-90 Usage of Major Distance Education Systems as of 3/1/90 (in numbers of districts)

	AK	HI	ID	MT	OR	WA	Total
Alaska CCS	3**						3
EDUNET			3	37		1	41
IREDS			11				11
STEP	6*		2	4	8*	54*	74
Okla. St.			1		2	1	4
TERC	7	8		1	11	12	39
TI-IN			1	2	9*	1	13
	16	**8**	**18**	**44**	**30**	**69**	**185**

* **Some districts in these cases have multiple receiving schools.**

** **This identifies only the districts using e-mail supplemented CCS courses in school.**

1989-90 Student Impact of Major Distance Education Systems

Systems	Schools	Students
Full course:		
Alaska CCS	3	5
EDUNET	41	110
IREDS	11	74
STEP	93	1107
Oklahoma State	4	41
TI-IN	21	146*
Subtotal	**146**	**1483**
Supplemental:		
Kids Network	32	900 est.
TERC	39	350 est.
Subtotal	**63**	**1250**
Grand Total	**236**	**2733**

* **This number represents only students enrolled in credit courses, and does not include students using supplementary enrichment programs for which enrollment is not recorded.**

One general observation about the data is that the penetration of the major systems in the school market appears more limited than one would expect judging from the publicity about distance education since 1986, and from the number of schools and districts which could benefit from it. It is known from the needs assessments done by NWREL in Washington and Idaho in the past two years that distance education is important to educators, especially in rural settings, primarily for expanding and enriching instruction and providing equality of opportunity. If this picture is correct, the services are available and there is a felt need, but a large number of districts are not using them. There could be many reasons for the disparity, and the truth is probably a complex interaction of them all. Some of the reasons were alluded to in section II, where some observations were made concerning the conditions which would enable or constrain increased use of those systems. The conditions are summarized and generalized here to provide part of the setting for the future development and application of distance education in the region.

Enabling Conditions

A significant characteristic of this region is that a large number of school districts are rural and small or very small, and many of those are quite remote from population centers. In a small high school staff of five teachers or less, it is difficult for a district to assemble all the skills necessary to offer a comprehensive curriculum, especially in foreign languages or advanced topics in science or other subjects, so there is a need to supplement the offerings, in some cases even for required subjects. Furthermore, as university requirements rise, capable students also need additional offerings, but there are very few such students at any given site, so a means of individual instruction is important. Although the per-student costs of instruction are high for those situations, there is strong support from the parents and legislators from rural communities for the increased use of distance education to equalize opportunity for their children.

A second condition is the concern in all the states in the region for their long-term economic health, and the resulting need to lay the groundwork for heavy involvement in the development of trade with Japan, Korea, and other countries of the Pacific Rim. A related issue is the sense of competition among the states of the region for business and investment from those countries. These concerns are reflected in the desire of both urban and rural school districts to offer foreign languages in their curriculum, especially Japanese.

A third condition is the sense, shared with the rest of the nation, that the United States needs to be more competitive economically in the future, and that to achieve such status implies improvement in and increased emphasis on mathematics and science instruction. This generates a desire for offering secondary students advanced studies in calculus, physics and chemistry, the teachers for which are sometimes difficult to obtain in rural schools.

A fourth enabling condition is the high level of activity in the development of the telecommunications infrastructure in the states in the region. Statewide planning activities indicate that state governments in general are serious in their pursuit of communications access for education and other state agencies. If the plans come to fruition, as some are even now, improved and economical access to educational resources by telecommunications of various types will be a reality for most schools in the region by 1992.

Another condition is that the region is well-supplied with centers of expertise and production facilities capable of satisfying the range of needs. Instructional design expertise resides in the universities, school districts, and state education agencies. Experience in the design and development of student courses and inservice instruction for individualized and group-based instruction using various technologies resides in the personnel of the several existing projects, and in higher education institutions as well. Expertise and facilities for the production and transmission of instruction by telecommunications exists in STEP, IREDS, EDUNET and the state and local public broadcasting entities, and in certain universities and school districts as well. Courses and supplementary instruction are already supplied from within the region in math, science, and foreign languages. Significant collaboration between public and private entities can be seen in the STEP, IREDS, and Big Sky Telegraph projects.

Finally, teachers and other education professionals who have participated in the distance education delivery systems described here express excitement about the promise of the new technologies for improved opportunities for students and improved instructional tools for themselves. Interviews with teachers conducted by NWREL staff in

the process of project evaluation reveal a positive attitude even when the inevitable problems in pilot tests occur. In addition, they show a healthy skepticism about the degree to which technology can take over teaching tasks, and make creative efforts at integrating the opportunities with the current instructional processes. In short, there appears to be a large reservoir of good will in the professional force, and a willingness to experiment with new approaches which have promise for improving opportunities for students.

Constraints

Although the enabling conditions provide a highly positive picture of the potential, some factors could work against an expansion of the use of distance education in the region. The high cost of a large expansion of production and use of distance education is a major constraint. The problem is that significant areas of all the states in the region are economically depressed, and in some cases the state structures for school funding provide insufficient resources for local districts to engage in special programs, or at least discourage districts from venturing new initiatives.

Cost is a factor for both the producer and the user, although in fact the development costs for producers are reflected in the membership or subscription costs for the users. The cost of design and development of a new course for television delivery is at least $250,000 and can be $500,000 or more depending on the level of effort in such areas as graphics, use of other media, and custom filming or location filming. Costs for a potential school user are reflected in facilities, staff, and initial and continuing subscriptions to a delivery system. Initial costs are particularly associated with satellite-delivered television, because the school must invest in a receiving antenna (dish), which can be in the range of $4,000 to $5,000. In the case of STEP and TI-IN, this cost is included in the initial membership fee. With TI-IN, the initial hardware includes not only the external dish, but also a complete receiving station for the classroom with a telephone for contacting the transmission site. In the TI-IN case the total initial cost is approximately $10,000. Recurring costs for subscribers to any of the systems are based on the number of courses and the number of students. The more the use, the greater the total cost to a school, but the lower the cost per student. Hence, the highest per-student costs accrue to schools with the fewest students and the greatest need, those which are rural and small.

To a certain extent, the state rules for certification, accreditation, class size and course approval deter delivery systems from expanding outside the state of origin. Some of these rules were written before the advent of distance instruction based on telecommunications, when the assumption was that the teacher would be in the classroom, and would be the primary source of knowledge. Also, the states vary in the specifications for a teaching certificate, and it may be necessary for a delivery system to have its teachers certified separately in all the states it serves. Distance education systems frequently specify that an on-site monitor or facilitator be appointed to provide supervision and other functions usually handled by a classroom teacher. Rules vary regarding certification requirements for a person in such a position. Oregon and Montana have already moved to modify the rules to accommodate the new approaches, and such considerations are included in other state plans, but the rules still differ from state to state.

A third constraining factor is that some of the major resources in the region are designed as services within state boundaries. There is no mechanism or financial support for extending the service. One such example is the Alaska CCS, the most extensive technology-based correspondence study service in the region. Another is the EDUNET project, a system designed to be transportable to another locale and governance structure, but for which the actual transfer has not yet been tested.

A fourth constraint is a lack of knowledge of the field of distance education on the part of local school staffs, which restricts their ability to develop long-range plans, to incorporate distance education in existing structures and curricula, and to make informed selections from the variety of options available. Through the Rural Education Initiative, NWREL has provided limited assistance, and several state education agencies have provided advice and assistance, but many districts still need help.

Unanswered Questions

As noted previously, there are many services in different types of distance education available in the region and an expressed need or desire for them in many schools, but not a lot of schools are using the services in comparison to

the number which could. In the evaluation activities conducted by NWREL staff between 1988 and 1990 in the STEP and EDUNET projects and in the Alaska needs assessment, district superintendents were interviewed or provided a questionnaire in which their opinions were solicited on priorities, roles, and preferences on aspects of distance education. The desire for distance education opportunities was high in all situations. When compared to other improvements which could be made in instruction, distance education ranked moderate to high in priority. Those who are current users of satellite-delivered television courses think it is a good technique but want more options, and some question the current quality. Those who are current users of electronic mail-based EDUNET system like the system for the opportunity it provides and the individual discipline it requires of students, but think a television system would be better. Those in Alaska who have neither system indicate a clear preference for interactive television as the delivery system.

In all cases, cost is cited as a primary deterrent to increased use of distance education, yet the members of the STEP project have supported the higher cost of the television system and have formed a cooperative to save costs where possible. If they were able to afford the cost of the system, why haven't others in other states, especially when STEP is one of the most transportable?

The preference for interactive television is clear, but the reasons for it are not. There seems to be a perception that a television course is higher quality instruction than one from an individualized electronic mail system. Do students taking a course by EDUNET compare poorly in achievement with those who take the same course from STEP, or perform less well in college? Some EDUNET users think their students are doing fine but are missing something. There is no evidence to provide guidance.

Finally, most seem to believe that a live teacher in the classroom is preferable to any of the distance methods, and this carries forward to the perception that students in a distance course should be supervised in the course activities by a certified teacher, though not in the subject of instruction. If this is true, is there anything to be gained from distance methods other than subject knowledge?

There are also questions from within specific projects which need answers. For example, the EDUNET project has experienced a drop out of students in the second semester in many courses, and have identified no reasons for it. The problem must be solved for the long-term health of the project.

It appears that much research needs to be done on questions of quality, student outcomes, and cost effectiveness of the various distance education systems. Furthermore, if collaborative or cooperative projects have been successful in overcoming cost barriers in certain locales, research on the factors involved may provide guidelines for the technical assistance needed to transport that success to other parts of the region. It may be that regionwide collaboration on certain aspects of distance education would help bring costs to a more affordable level.

Potential Roles for NWREL

Distance education in various forms appears to offer great benefits to the region in addressing problems of rurality and size, subject area expertise, and richness of experience. The task of increasing the effective use of distance education to realize those benefits contains several roles suitable for regional attention which NWREL could consider.

Coordination: Certain major problem areas might be amenable to a regionwide coordinating effort by an independent agency. These include standardization and/or reciprocity with regard to crucial state rules such as certification. Cooperative acquisition of satellite time could be beneficial, as would assistance in dealing with cross-border issues between networks, public or private. Development and coordination of a plan to make existing resources available across the region by forging links between state networks could result in greater access for schools and less redundancy in instructional development. NWREL could act as the broker for services from delivery systems outside the region.

Clearinghouse: Information on available programming options for student instruction and inservice change regularly. A central regional agency could keep track of such information and disseminate it regularly to SEAs and

LEAs. Some of the relevant tasks are now being carried out across the region in SEAs, LEAs, and regional centers for their own constituents, but many districts still have no access to the information. Thus, there is redundancy without complete coverage.

Technical Assistance: Inservice instruction could be provided through workshops for teachers, planners and others for different levels of expertise, dealing with design, selection, integration, etc. Planning assistance could be provided to the organizations operating delivery systems in the region.

Evaluation and Assessment: Evaluation could be conducted of courses, materials and programs from several standpoints such as design, effectiveness and impact. Needs assessment of economic or other special impacts could be carried out for a project, state, or the region.

Research: Many questions have been asked about such topics as the effectiveness of various modes of distance education, the effect of on-site intervention by teachers or aides, and other aspects of distance education which could be addressed through a program of research. Coordination of a broad-scale research agenda with higher education institutions in the region could be carried out.

Planning: Region-wide planning efforts could be carried out by NWREL in areas such as telecommunications system linkages and program offerings to minimize redundancy and maximize the effectiveness of limited development resources.

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The Northwest Regional Educational Laboratory (NWREL) is an independent, nonprofit research and development institution established in 1966 to help others improve outcomes for children, youth, and adults by providing R&D assistance to schools and communities in providing equitable, high quality educational programs. NWREL provides assistance to education, government, community agencies, business and labor by:

- Developing and disseminating effective educational products and procedures
- Conducting research on educational needs and problems
- Providing technical assistance in educational problem solving
- Evaluating effectiveness of educational programs and projects
- Providing training in educational planning, management, evaluation and instruction
- Serving as an information resource on effective educational programs and processes including networking among educational agencies, institutions and individuals in the region

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